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Investigating Stability Balls in the Classroom: Effects on Student Behavior and
Academic Productivity

By

Natasha A. Olson, M.S.

A Dissertation Submitted in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Psychology
in
School Psychology

Minnesota State University, Mankato

Mankato, Minnesota

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Investigating Stability Balls in the Classroom: Effects on Student Behavior and
Academic Productivity

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Date

Copyright

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Dedication

This dissertation is dedicated to my family and significant other, Robert. Thank you for being patient and encouraging me during this adventure. Each of you has inspired me in many ways and I am appreciative of all your love and support.

Acknowledgements

I would like to thank the members of my committee, Dr. Carlos Panahon, Dr. Kathy Bertsch, Dr. Daniel Houlihan, and Dr. Alexandra Hilt-Panahon, for their dedication to my training and research. This project would not have been possible without their wisdom and feedback.

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Abstract of the Dissertation

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by

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Doctor of Psychology in School Psychology
College of Graduate Studies and Research
Minnesota State University, Mankato, 2015
Carlos J. Panahon, Ph.D., Chair

A classroom intervention increasing in popularity is the use of stability balls in lieu of traditional classroom seating. Stability balls are promoted as an effective alternative to chairs at a classwide level, yet there are no published studies documenting classwide outcomes. Therefore, the purpose of this study was to investigate classwide effects of stability balls and attempt to provide empirical support for their use. Using an A-B-A-B reversal design, this study examined the effectiveness of stability balls in comparison to classroom chairs in a second grade classroom. Student on-task and out-of-seat behavior was measured using direct observation and teacher direct behavior ratings. Academic productivity was measured using curriculum-based measures of written expression. Stability balls did not show marked improvements over baseline for either on-task or out-of-seat behavior. However, stability balls were as effective as chairs with greater variability. Teacher direct behavior ratings did not demonstrate clear improvement in behavior while students were seated on stability balls. Results demonstrated slight improvement in writing fluency over the course of the study. However, results were comparable for both types of seating. Overall, teacher and student social validity measures indicated high levels of acceptability of stability balls in the classroom.

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Chapter 1

Introduction

A classroom intervention increasing in popularity is the use of stability balls in lieu of traditional classroom seating. Stability balls, also referred to as Swiss balls, exercise balls, yoga balls, or therapy balls (Bagatell, Mirigliani, Patterson, Reyes, & Test, 2010; Carriere, 1998; Schilling & Schwartz, 2004; Schilling, Washington, Billingsley, & Deitz, 2003), are large inflated balls made of soft, elastic plastic or rubber. Those used for classrooms typically include small cylindrical feet that help the ball from rolling when not in use. Stability balls are also available in a variety of sizes based on students' height to create a customized fit (WittFitt, 2014).

Stability balls have been suggested to increase levels of focus and attention while improving academic achievement (Schilling et al., 2003). Spalding, Santopietro, and Posner-Mayer (1999) describe the effects by stating that “replacing the standard stable classroom chair with an unstable ball that moves can be therapeutic because it does the following: (a) activates postural muscle control resulting in better hand control; (b) improves visual skills for improved focusing, tracking, and scanning; (c) stimulates the vestibular sense for better balance reactions and alertness; (d) stimulates proprioception for better muscle control and force of movement; (e) coordinates the two sides of the body for improved midline orientations; and (f) improves pronunciation of words by promoting jaw stability through improved postural control. Each of these benefits enhances sensory processing, thereby increasing alertness and sustained attention, which, of course, facilitates learning” (p. 13-14). Furthermore, it is theorized that a student can maintain concentration while seated on the stability ball because the unstable surface

requires continuous, yet minor movement. In a sense, the stability ball allows the student to “fidget” or move their body inconspicuously, which then helps the student to stay focused while seated.

The use of stability balls in the classroom has been subject to mass media attention since approximately 2005. Many newspaper articles and news segments across the United States have provided anecdotal reports of the benefits of stability balls in a classroom setting. Garvey (2009) reports that ball chairs are becoming increasingly popular at a national level. Schools in Chicago have also adopted stability balls for entire classrooms with the hopes of improving student concentration. USA Today reporter Kristen Wyatt (2009) discussed stability balls with a fourth grade teacher, Ms. Miller, who purchased stability balls for her classroom in Fort Collins, Colorado. Ms. Miller reported that the theory behind their use is that when the students engage their body while seated on the stability balls this allows their brain to be engaged as well. She calls this “actively sitting” and that although the students move their legs and lower body while seated on the ball, their upper body is focused on writing and listening to instruction. Ms. Miller’s students also reported favorable outcomes, including one student who said that before using the balls students were unable to move in their seats and could not learn as well as they do now. Stability balls are also being used in school districts in Minnesota. Estrada (2007) reported that St. Paul Academy and Summit School began using stability balls in 2005 and were the first in the state to begin using them primarily in math classes. Since then, other Minnesota schools have begun adopting them in a variety of classrooms focusing on whole-class implementation. A predominate pattern found in these reports is

that stability balls are described as an outlet for students who have high levels of energy and tend to fidget in their classroom chairs.

Previous research investigating stability balls for student back-health indicated positive improvement in attention, sustained sitting, and academic performance (Illi, 1994; Witt & Talbot, 1998), however these behaviors were not measured directly. In addition, there are few published studies evaluating the effectiveness of stability balls as they relate to student behavior. Currently research has evaluated stability balls within various populations including elementary students with attention-deficit/hyperactivity disorder (ADHD; Fedwa & Erwin, 2011; Schilling et al., 2003) young children with autism spectrum disorder (ASD; Bagatell et al., 2010; Schilling & Schwartz, 2004), and college students (Kilbourne, 2009).

Schilling and colleagues (2003) were the first to systematically examine the use of stability balls and the effects on in-seat behavior and legible word productivity in a fourth grade classroom. An A-B-A-B design was used in which three students with ADHD were observed and handwriting assessed while seated on classroom chairs and stability balls. Although the stability balls were implemented classwide (24 students), only 3 students with ADHD were the targeted for this study. Student in-seat behavior was observed using a 10-second momentary time sampling method. Legible word productivity was assessed using language arts assignments. Students were given the same assignment and each word was scored by independent raters for legibility. The legibility of each assignment was then compared to the class average on the same assignment. Each phase of the study lasted 3 weeks with an additional week of training (i.e., novelty phase) for a total of 12 weeks. Results showed that in-seat behavior and legible word productivity improved

while students were seated on the stability ball in comparison to classroom chairs. On average, target students were seated 60% of the time during baseline in comparison to 96% of intervals when seated on the stability ball. During baseline, legible word productivity across target students ranged from a 20 to 100% difference from the class average. However, the target students' legible word productivity either met or exceeded the class average while seated on stability balls. In addition, the target students reported preferring the stability balls to classroom chairs. This was also true of other students in the classroom and the teacher continued to use the stability balls after the completion of the study.

Extending these findings, Schilling and Schwartz (2004) investigated the use of stability balls in a classroom of preschool children who were diagnosed with autism spectrum disorder (ASD). The purpose of the study was to investigate a sensory approach to services with additional opportunities and strategies to adjust sensory input in order to maintain appropriate behaviors in the general academic setting. The authors hypothesized that stability balls would provide children with ASD the freedom to actively move and achieve sensory regulation in order to sustain attention and remain seated. One classroom was selected due to high rates of out-of-seat and off-task behavior. Four preschool children, 1 classroom teacher, and 4 staff members participated in the study. An experimental single case research design (A-B-A-B for 3 students and B-A-B for 1 student) was used to assess the effects of the use of stability balls on in-seat behavior and task engagement. Each implementation was customized for the intervention needs of each student. Specifically, one student displayed difficulty remaining seated during tabletop activities and was not able to attend to most tasks, while another student displayed

difficulty remaining seated and engaged during circle time. Based on the information provided by the classroom teacher, different activities and settings (e.g., small group, end of day, extended day program) were selected for intervention depending on when the behaviors most often occurred. During baseline, typical classroom or program routines remained constant and observations occurred at the same time of day assessing engagement and in-seat behaviors. During intervention, students were given a stability ball and asked to use them for 2 weeks. In addition, the classroom teacher and staff were asked to complete social validity questionnaires regarding the intervention and behaviors displayed by each student. Results showed an improvement in engagement and in-seat behavior across all participants during stability ball implementation. Social validity measures indicated favorable response from all staff and reports of increase independence, task completion, and engagement. Staff also reported high rates of movement and bouncing that was expressed as distracting, however the increased engagement and in-seat behaviors improved regardless.

Bagatell and colleagues (2010) also investigated the use of stability balls with children with ASD in a kindergarten and first grade classroom. One teacher, 3 staff, and 6 students participated in the study and an A-B-C design was used. Stability balls were implemented in the classroom for 2 weeks during circle time that occurred daily for 16 minutes. In-seat behaviors and academic engagement were observed through video recordings of the target students. In addition to baseline and intervention phases, a choice phase was also implemented to allow students the option of sitting on a stability ball or classroom chair for the remaining 5 days of the study. One student displayed a substantial decrease in out-of-seat behavior and chose to continue using the stability ball during the

choice phase. However, the remaining 5 students did not show improvement during intervention phases with slight to moderate increases in disengaged behaviors and little to no improvement in out-of-seat behaviors. In addition, the teacher reported that the stability ball did not appear to increase in-seat and engagement across students, and did not allow the students to sit quietly or follow expectations. In a 1-year follow-up, the classroom teacher did not continue using the stability balls in the classroom except for sensorimotor activities.

In addition, Fedwa and Erwin (2011) examined a whole-class application of stability balls in four elementary school classrooms specifically targeting the on-task and in-seat behaviors of students displaying ADHD characteristics. Four fourth- and fifth-grade classroom teachers were asked to complete an ADHD rating scale for each student prior to the intervention and at the conclusion of the study. Although all students were given a stability ball, eight students were classified as having a “high” or “very high” probability of ADHD and were selected for behavioral observations throughout the duration of the intervention. Of the eight target students, five had a diagnosis of ADHD but were not taking medication and each student had an individualized education plan (IEP) for behavioral and academic concerns. During baseline, students’ in-seat and on-task behaviors while seated in classroom chairs were observed 3 times per week for 2 weeks. During intervention sessions, the students’ chairs were replaced with stability balls for a total of 12 weeks. Results indicated that in-seat and on-task behavior improved dramatically for all students over the course of the intervention. On average, target students were seated 94% of the time and on-task 80% of the time when seated on the stability ball in comparison to 45% in-seat and 10% on-task during baseline sessions. In

addition, teacher ratings of ADHD symptoms significantly decreased for the target students, and resulted in scores in the average range.

In an effort to extend previous findings, Kilbourne (2009) provided 52 college students with the option of sitting on a stability ball during a 14-week lecture course. Four classes were selected for participation and students were able to choose daily as to whether or not they would like to sit on a stability ball as an alternative to their classroom chair. At the conclusion of the class, students were asked to complete a questionnaire regarding their experience using the stability ball. Students recorded their responses using a 5-point Likert-type scale (1-being negative and 5-being positive) to statements such as their level of ability to pay attention in class, take notes, engage in classroom discussions, and if given the opportunity would he or she use the stability ball in additional courses. Student responses indicate a positive rating (4.0 or higher). In addition, 98% of students chose to use the stability balls during instruction, while one student refrained.

Currently, there is limited research available investigating the use of stability balls in the classroom setting. Not only is the amount of research lacking, but also the methodologies used and populations have varied limiting both generalizability and conclusions. In addition, current research has either been implemented classwide without reporting classwide results or has been implemented with select students. Nevertheless, stability balls have been commercialized, their use has become widespread, and they are promoted as an effective intervention at an individual and classwide level. Considering schools are increasingly expected to select and implement interventions that have research documenting their use (i.e., evidence-based practices; Kratochwill & Shernoff,

2004) additional research is needed in order to demonstrate whether or not stability balls are effective for improving classroom behavior and academic performance.

In order to examine the need for additional research, a recent survey conducted by Olson, Lamminen, and Panahon (2014) investigated familiarity and use of stability balls in schools. The survey was distributed electronically in Southern Minnesota and 76 teachers responded. Most teachers indicated that they were familiar with stability balls, however most respondents had not used stability balls in their classroom. Of those who had used them, most teachers indicated that they were motivated to use stability balls due to student behavior (97.7%) and student achievement (42.2%). More specifically, teachers reported implementing the intervention expecting stability balls to reduce off-task behavior (93%) or increase on-task behavior (81.4%). Other purposes for adopting stability balls in the classrooms included increasing academic productivity (69.8%), decreasing out-of-seat behavior (62.8%), and improving the classroom environment (41.9%). When asked to rank which behaviors he or she felt could be improved by using stability balls, the highest ranked behaviors included concentration or focus, fidgeting, and out-of-seat behaviors. Most teachers indicated that they used stability balls on an individual student basis (77.4%) in comparison to classwide (22.7%). Those who indicated that they used stability balls at an individual level predominately implemented them in kindergarten through fifth grade classrooms. Of those who indicated that they used stability balls at a classwide level, most teachers were using them with first and second grade students.

Measuring the Effects of Stability Balls

Previous research has utilized various methods for investigating the use of stability balls including behavioral observation, legible handwriting, and self-report measures. Recent survey results indicated that teachers implemented stability balls in the classroom in order to increase on-task behavior, decrease out-of-seat behavior, and improve academic productivity. Therefore, these behaviors were selected and the following measurement strategies were reviewed in an effort to discern methodology for further investigation of stability balls in the classroom.

Behavioral Assessment. There are several techniques that could be used to investigate the aforementioned benefits of stability balls. One such method is systematic direct observation (SDO) of behavior. Direct observation methods are defined by recording stimulus and response events by use of observers (Bass & Aserlind, 1984). More specifically, direct observation is a procedure used to quantify behavioral responses in some respect (Hartmann & Wood, 1990), and has often been cited as the “gold standard” of the behavioral approach to assessment and evaluating intervention effectiveness because of its precise measurement of observable behavior with low levels of inference (Baer, Wolf, & Risley, 1968; Khang, Ingarvsson, Quiff, Sckinger, & Teichman, 2011; Suen & Ary, 1989). It has been used extensively in the field of psychology to study various hypotheses (e.g., Langfeld, 1913; Ostrov & Hart, 2013), offer characteristics of behavior, and has been cited as the most used data collection procedure (Bass & Aserling, 1984; Hartmann & Wood, 1982; Kelly, 1977). Direct observation methods are also flexible, relatively simple, and applicable to a wide-range of populations, settings, and behaviors (Hartmann & Wood, 1982).

Interval recording and time sampling methods of observation are designed to estimate the actual occurrence of behavior. Rather than noting the frequency or duration in which a behavior occurs, an observer records a target behavior during a predetermined time period (e.g., 20 minutes). The time period is then divided into equal intervals (e.g., 10-second intervals) in which the occurrence of a behavior is recorded and the behavior occurrences are represented as a percentage of occurrences within the observational period (Copper, Heron, & Heward, 2007). With interval recording and time sampling procedures it is possible to record continuous behaviors and high-frequency behaviors that are incompatible with event recording (Alberto & Troutman, 2009). These methods have been used with various behaviors including positive behavior such as academic engagement and sharing (e.g., Bryan & Gast, 2000; Massey & Wheeler, 2000; Reincke, Newman, & Meinberg, 1999), and problem behaviors such as tantrums, stereotypy, and self-injury (e.g., Kennedy, Meyer, Knowles, & Shukula, 2000; Lalli, Kates, & Casey, 1999; Wacker et al., 1996).

There are two types of interval recording methods including partial- and whole-interval systems. Observers using a partial-interval system record the occurrence of a behavior if it occurs at any time during the interval. Rather than being concerned with the frequency or duration in which the behavior occurred, partial-interval systems recognize that at some point during an interval that the behavior occurred. Thus if a behavior occurred multiple times during an interval, the behavior is recorded as having occurred during the interval without regard to the frequency in which it occurred. Because observers are only required to record if a behavior occurs at any time during each interval, it is possible for observers to record multiple behaviors displayed such as on-

task, disruptive, and work completion behaviors (Cooper et al., 2007). On the contrary, the whole-interval method requires that a behavior be displayed during the duration of an entire interval in order to be recorded as an occurrence (Alberto & Troutman, 2009). Whole-interval methods are typically used to measure continuous behaviors (e.g., cooperative play) or behaviors that occur at such high rates that it is difficult to distinguish one behavior occurrence from another (e.g., humming), but the behavior can be detected when it has occurred (Cooper et al., 2007).

Both interval recording methods are likely to provide biased estimates of behavior. More specifically, interval recording may underestimate the true frequency of a behavior such that the behavior may occur multiple times during an interval, yet only be recorded as one occurrence (i.e., partial-interval) or the behavior may not always occur throughout an interval in order to be recorded as an occurrence (i.e., whole-interval; Bailey & Burch, 2002). On the contrary, partial interval recording may overestimate the total occurrence of long-duration or continuous behaviors that do not have a discrete ending (Alberto & Troutman, 2009). For example, a behavior may occur for 2 minutes and be recorded successively during each interval. In addition, the interval method used and/or time units must take the defined behavior into consideration (Ostrov & Hart, 2013). For instance, the longer the interval used with a whole-interval system (e.g., 5-second vs. 30-second intervals) the greater degree to which the method may underestimate the true occurrence of the behavior. Another concern is that observers are required to attend to observation forms rather than the observed persons. An interval on-off system can alleviate this problem by allowing observers to observe for a specified amount of time with an additional interval designated for recording behaviors observed.

For example, the observer may observe for 10 seconds and record for 5 seconds (Bass & Aserlind, 1984).

Another sampling method is momentary time sampling (MTS) in which an observer records whether the target behavior is occurring at the moment the interval ends (Cooper et al., 2007). For example, an observer using a 10-second interval would observe the target participant at the 10-second mark in order to determine whether or not the behavior was occurring. This would occur again at the conclusion of each interval (i.e., 20 seconds, 30 seconds, etc.) and continue until the end of the observation session. Observation data are reported similarly to interval recording systems such that data are reported as percentages of the total intervals in which the behavior occurred. Thus, MTS is an estimate of the proportion in which the behavior occurred during the observation session. An advantage of this system is that the observer only observes at the conclusion of each interval. On the contrary, observing at the conclusion of an interval causes behavior to be missed (Cooper et al.) and is not suggested for measuring low frequency and/or short duration behaviors (Saudargas & Zanolli, 1990).

As stated previously, there are advantages and disadvantages to using interval recording and time sampling methods for behavior observation. Powell, Martindale, and Kulp (1975) compared whole-interval, partial-interval, and time sampling procedures for the in-seat behavior of an office assistant. The range of intervals for whole- and partial-interval ranged from 10 to 120 seconds and time sampling intervals ranged from 10 to 600 seconds (i.e., 10 minutes). Results indicated that time sampling data were accurate to an upwards of 120 seconds whereas the whole- and partial-interval data differentiated from true occurrences with intervals of 80 seconds or more. Powell, Martindale, Kulp,

Martindale, and Bauman (1975), replicated these procedures with varied observation interval lengths. Results were consistent with Powell, Martindale, and Kulp (1975) such that time sampling was the most accurate in comparison to whole- and partial-interval observations. Whole- and partial-interval observations repeatedly under- and over-estimated true levels of behavior, respectively, as the length of the intervals increased (Powell, Martindale, Kulp, Martindale et al.).

Gardenier, MacDonald, and Green (2004) compared partial-interval recording and MTS with continuous measures of stereotypy behavior displayed by children with autism spectrum disorders. Videotaped samples of behavior were scored and relative durations were calculated. MTS intervals at 10, 20, and 30 seconds and 10-second partial interval recordings were compared to raw duration data. Results indicated that MTS over- and under-estimated stereotypic behavior, however error was much smaller in comparison to partial-interval recording. Rather, partial-interval recording overestimated the duration of stereotypic behavior. Upon replication, results were similar for low, moderate, and high levels of stereotypy as well (Gardenier et al.). Results from these studies indicate that interval length, behavior, and possibly population of interest may affect the accuracy of interval recording and time sampling methods. Therefore, these features should be taken into consideration prior to selecting an appropriate observation method.

Round-robin format is one way of adapting interval recording and time sampling for use with a group of target individuals (Cooper, 1981; Lloyd, Bateman, Landrum, & Hallahan, 1989; Thompson, Holmberg, & Baer, 1974). Using this format, observers obtain an estimate of a group's behavior by recording the behavior of one group member during each interval (Alberto & Troutman, 2009). For example, a group of students may

be observed during a math period using 10-second intervals. The math period would be divided into intervals and allow for each student to be observed equally. More specifically, each student is assigned the same number of intervals and would be observed on a rotating basis until the conclusion of the observation session.

Lloyd and colleagues (1989) used the round-robin format to observe student on-task behavior. Five students were observed using a 3-second MTS method in which the observers rotated across each student sequentially. For instance, the observer sampled the behavior of one student at the end of the 3-second interval before observing a second student at the next 3-second interval, and so on (Lloyd et al., 1989). Sutherland, Wehby, and Copeland (2000) also used the round-robin format in which a class of nine students was divided into 4 quadrants, with each row of students representing a quadrant. Each row was randomly assigned a quadrant for each observation and each row was observed for 1-minute intervals. A behavior occurrence was only recorded if all students in the row were engaging in the target behavior (i.e., on-task; Sutherland et al.). Although this method results in an approximation of the group's behavior, it does not provide an accurate representation of the behavior of any individual group member (Alberto & Troutman, 2009).

On the contrary, Chafouleas, Riley-Tillman, and Sugai (2007) suggest that there are limitations in the use of SDO in a school setting due to the substantial resources required including trained personnel, intensive data collection requirements, and time. Although the observation session may only last 20 minutes, the observer is required to complete the observation on multiple occasions in order to achieve a thorough analysis. For instance, if an observer is only able to collect data once per week, the required data to

make accurate conclusions may take a month to gather adequate amounts of data. The time required for SDO may delay early intervention and/or increase behavior concerns (Riley-Tillman, Chafouleas, & Briesch, 2007).

Therefore, a recently growing body of research has focused on formative behavior assessment using tools that are designed as brief rating scales, an assessment method titled Direct Behavior Rating (DBR; Chafouleas, Christ, Riley-Tillman, Briesch, & Chanese, 2007; Chafouleas, Riley-Tillman, & Christ, 2009; Chafouleas, Volpe, Gresham & Cook, 2010). DBR involves an abbreviated or brief rating of behaviors that occur following a predetermined observation period. As stated by Chafouleas (2011), “In brief, DBR entails procedures and instrumentation in which a rater quantifies perception of a directly observed behavior” (p. 578). Essentially, DBR is a behavioral assessment method that combines the strengths of efficient recording systems (i.e., rating scales) and SDO (Chafouleas, Christ, et al., 2007; Chafouleas, Riley-Tillman, et al., 2007; Christ, Riley-Tillman, & Chafouleas, 2009). For instances a teacher may use a 0 to 10 scale to rate the percentage of time (i.e., 0 to 100%) in which a students was on-task during a designated class period. The procedures require a relatively short observation that is immediately followed by a rating generated by the observer. These data provide specific estimates of student behavior including times and settings, and these data can be aggregated to generate comparison across observation sessions (Chafouleas, 2011).

DBR includes the direct application of SDO using specific behaviors and the evaluative qualities of rating scales (Chafouleas, 2011). There are 3 types of DBR methods including direct behavior rating multi-item scales (DBR-MIS), direct behavior rating single-item scales (DBR-SIS) and daily behavior report cards (DBRC). As the

names would suggest, DBR-MIS is used to rate more than one operationally defined behavior following a predetermined time whereas DBR-SIS is used to rate a single, operationally defined behavior. In contrast, DBRC requires a specific behavior to be rated daily and data collected are shared with someone other than the rater (Chafouleas, Riley-Tillman, & McDougal, 2002). An advantage of DBR-MIS and DBR-SIS in comparison to SDO and other behavioral assessment methods is that DBR scales can be customized based on an individual pattern of behavior (Volpe, Gadow, Blom-Hoffman, & Feinberg, 2009). Volpe and Briesch (2012) compared DBR-MIS and DBR-SIS using generalizability theory (GT; Cronbach, Gleser, Rajaratnam, & Nanda, 1972) to examine the dependability of DBR-MIS and DBR-SIS. More specifically, generalizability and dependability studies were conducted to determine the number of rating sessions necessary for each method to achieve an appropriate level of acceptability. These factors relate to how often information must be collected and how quickly the data can be used for intervention purposes. Results indicated that the most efficient tool was DBR-MIS in comparison to DBR-SIS due to the limited information collected. Therefore it is suggested that DBR-SIS may not dependably estimate student behavior over time (Volpe & Briesch, 2012).

In addition, DBR-SIS has been compared to SDO. Using generalizability theory, Briesch, Chafouleas, and Riley-Tillman (2010) compared the behavior estimates of teacher-completed DBR-SIS and observer-completed SDO of student academic engagement. Results indicated that both methods are equally sensitive to changes in student academic engagement. However, some differences were noted. More specifically, SDO variance was explained by changes in student behavior across days and rating

sessions whereas DBR-SIS variance accounted for rater-related differences including teachers' perceptions of the behavior of particular students varied. These results indicate that although SDO and DBR-SIS are equally sensitive to behavior change, a rater bias effect may occur when using DBR-SIS.

DBR has also been examined in a classwide assessment of student academic engagement. Riley-Tillman, Methe, and Weeger (2009) examined student on-task behavior in a first-grade general education classroom comprised of 14 children and 1 teacher. DBR was used as a secondary dependent variable to support the reliability of the SDO outcome data. For SDO, students were observed using a 15-second modified partial-interval system in which observers observed each student for 10 seconds and 5 seconds were used to record observation information. Each student was observed sequentially for a total of 10 minutes, allowing each student to be observed for 3 intervals. For DBR, the teacher was instructed to complete a two-item DBR (0-10 rating) after the class period and indicated a percentage of time (0-100%) in which the class was on-task and the percentage of time (0-100%) in which the class was off-task. SDO and DBR data are strikingly similar across all phases. More specifically, the SDO and DBR estimates of student behavior differ by 4.5% on average (Riley-Tillman et al.). These findings suggest that SDO and DBR achieve similar results when compared classwide.

Academic Productivity. In addition to behavioral observation, investigating student's academic productivity while seated on stability balls may also be useful. In addition to improving student behavior, recent survey results (Olson et al., 2014) indicated that academic productivity was another purpose of implementing stability balls in the classroom. Thus far, only one study has investigated the effects of stability balls on

academic performance through legible handwriting (Schilling et al., 2003). Although this study showed favorable results, handwriting is only a subskill of the more broad academic area of written expression. Extending previous research to academic performance in writing expression could be assessed using curriculum-based measurement (CBM; Deno, 1985). Curriculum-based measurement (CBM; Deno, 1985) is an approach designed to evaluate the progress of students in basic academic skills through the use of standardized assessments developed from a school's curriculum (Deno, 2003; Shinn, 2008). Developed by Stanley Deno and colleagues at the University of Minnesota over 25 years ago, CBM was designed to assess the basic skills of reading, writing, spelling, and mathematics and is a set of scientifically validated and standardized assessment measures (Shinn, 2007). CBM was proposed as an alternative to traditional, mastery-based measurements of academic skills (e.g., end of unit tests; Fuchs, 2004) in an effort to frequently assess students' rate of progress and inform modifications to instruction and interventions as needed (Shinn & Shinn, 2002).

Moving beyond legible handwriting, written expression CBM consists of students writing for 3 minutes in response to an age-appropriate story starter. Written expression CBM has been used with elementary students (Deno et al., 1980; Deno, Marston, & Mirkin, 1982), middle school students (Espin, Skare, Shin, Deno, Robinson, & Benner, 2000), high school students (Espin, Scierka, Skare, & Halverson, 1999), and student with learning disabilities (Watkinson & Lee, 1992). More specifically, students are given a story prompt such as "It was a hot, dry day when..." and given 1 minute to think about the story they will write. After 1 minute, students are given 3 minutes to write the story (Shapiro, 2010). Student responses are then scored on specific writing skills based on the

purpose of the assessment (Powell-Smith & Shinn, 2004). Numerous studies that have investigated scoring writing CBM including total words written (TWW), words spelled correctly (WSC), correct writing sequences (CWS), and total correct punctuation (Gansle, Noell, VanDerHeyden, Naquin, & Slider, 2002; Marston, 1989; Videen, Deno, & Marston, 1982). In terms of scoring methods, TWW and WSC are most often used with young students and to monitor writing fluency while other scoring methods are typically used as students develop more complex writing skills (Hosp, Hosp, & Howell, 2007).

Howell and Nolet (2000) identified components to writing that are important for student progress in written language including writing fluency, syntax, vocabulary, content, and writing conventions including spelling, capitalization, and punctuation. Interrelated writing skills include handwriting, fine motor skills, spelling, grammar, creativity, and expressiveness (Shapiro, 2011). In addition, the act of writing requires the writer to think about what he or she will write, then translate the thoughts through words, write the thoughts on paper and convey meaning through organization and expression. Therefore, written expression requires more than just writing words on a piece of paper. It requires sustained mental effort and attention to assign words to thoughts and then engage in the act of writing thoughts down on paper while using appropriate writing skills such as correct spelling, punctuation, grammar, and writing conventions (Robinson & Howell, 2008).

Current Study

Despite their popularity, there is limited research available investigating the effects of stability balls in the classroom. The few published studies have focused

primarily on students with disabilities (i.e., ADHD, ASD) using targeted implementation and have utilized varied methodology. Furthermore, stability balls have been popularized as a classwide intervention strategy yet there are no published studies that have documented classwide effects. Therefore the purpose of this study was to determine the effectiveness of stability balls at a classwide level and an attempt to provide empirical support for their use in the classroom. This study examined the effectiveness of stability balls in comparison to classroom chairs using direct behavioral observation, teacher behavior ratings, and assessment of academic productivity. More specifically, this study addressed the following research question: Are stability balls effective for improving classroom behavior and increasing academic productivity? To investigate their effectiveness, student on-task and out-of-seat behavior were observed using SDO and DBR-MIS. In addition, academic productivity was assessed using written expression CBM to document writing fluency. It was hypothesized that students will be on-task more frequently and out-of-seat less frequently when seated on stability balls in comparison to classroom chairs. Teacher DBR will demonstrate similar improvements in student behavior. In addition, students will increase their academic productivity as measured by writing fluency while seated on stability balls in comparison to classroom chairs.

Chapter 2

Method

Participants and Setting

Participants in this study included one second-grade classroom and one female teacher in a Southern Minnesota school district. The elementary school classroom had 20 second-grade students with one student with an undisclosed disability. Students were 7- to 8-years of age and included 11 males and 9 females. The teacher implemented stability balls in this classroom prior to this study, however stability balls were removed for 2 weeks prior to data collection. Before proceeding with data collection, this study received approval from Minnesota State University, Mankato's Institutional Review Board and the participating school district. In addition, teacher and parent consent were obtained as well as student assent to participate in the study was collected prior to the first day of data collection. Please see teacher and parent consent forms in Appendix A and B, and the student assent form in Appendix C. Parent consent was obtained for 15 of the 20 students. Individual student data were not collected for behavior observations and DBR, rather classwide data were reported. However, writing fluency data were collected individually thus data collected from students whose parents did not consent were omitted from analysis.

Materials

Students used traditional classroom chairs and stability balls as seating throughout the course of the study. During baseline, students were seated on their traditional classroom chairs (i.e., four-legged chairs with backrests). These chairs were made available by the school and accompanied each student's desk. For intervention

conditions, typical classroom seating was removed and replaced with stability balls. These stability balls were designed for students within this age group (i.e., second grade) and had cylindrical feet to deter the balls from rolling when not in use.

Standardized observation forms were used to directly observe behavior while students were seated on classroom chairs and stability balls. Each observation form included a section for session information (i.e., date of observation, time, observer name, condition) and boxes defined by 10-second intervals for each behavior. An observation form is available in Appendix D. For each observation, observers used a programmed interval timer to alert the observer at the beginning and end of each 10-second interval with a short vibration. Throughout the course of the study, a second observer simultaneously completed the observation form to assess inter-observer reliability.

In addition, the teacher completed a DBR form (Chafouleas, Riley-Tillman, & Christ, 2010) at the end of each observation session. The form included a section for session information (i.e., date of observation, time, rater name, activity) and definitions of on-task and out-of-seat behavior. During each session, the teacher was asked to rate the students' on-task and out-of-seat behavior throughout the observation period. The teacher was asked to indicate the percentage of total time the class displayed each behavior. See the DBR form in Appendix E.

Immediately following observation sessions, CBM probes in written expression were administered classwide by the researcher. Each student was given a pencil and a writing packet that included a writing prompt and lined paper. The class was provided a story starter such as "I stepped into the time machine and..." and given 1 minute to think about it. After 1 minute, students were given 3 minutes to write their story. Each writing

probe was dictated using a standardized script (i.e., writing protocol). Throughout the course of the study, a second observer simultaneously completed the writing protocol to assess the procedural integrity of the administration during writing probe administration. The writing protocol and writing packet are available in Appendix F and G.

Response Definition and Measurement

For the purpose of this study, the use of stability balls served as the independent variable. On-task and out-of-seat behavior, DBR data, and academic writing productivity served as dependent variables. Data collection occurred two times per week during the same writing period across 8 weeks. Twenty-minute behavior observations were completed during a continuous writing lesson and writing probes were administered immediately following behavioral observations. All data collected during baseline and stability ball conditions were included for analysis, aside from 2 sessions of initial baseline that occurred while a substitute teacher provided instruction. These data were removed from analysis to assure similar conditions across baseline and treatment, and as the substitute teacher's consent for participation was not obtained.

During behavioral observations, trained observers recorded the occurrence and nonoccurrence of on-task and out-of-seat behaviors in the classroom. A 10-second interval system was used to observe student behavior on a round-robin basis. Being that there were 20 students enrolled in the class, each student was observed on 6 occasions, if all students were present. Each 20-minute observation session was divided into 10-second intervals resulting in 120 intervals. Student on-task behavior was evaluated using momentary time sampling (MTS) such that the occurrence or nonoccurrence of on-task behavior was recorded at the beginning of each 10-second interval. *On-task* behavior was

defined as the student when the student is in the designated area of the room, oriented toward the teacher or task, following instructions, participating as instructed, engaged with appropriate materials, and seeking help in an appropriate manner (e.g., raising hand; Regan, Mastropieri, & Scruggs, 2005). Concurrently, students' out-of seat behavior was measured using partial interval recording. That is, the observer recorded the occurrence or nonoccurrence of out-of-seat behavior if it occurred at any time throughout each 10-second interval. *Out-of-seat* behavior was defined as the student leaving the seated position during instruction and walking within the classroom (i.e., wandering) or out of the classroom without permission. Exceptions included occasions in which a student leaves his or her seat with permission from the teacher. Permission from the teacher was defined as raising one's hand or approaching the teacher and receiving consent to engage in the behavior (Barrish, Saunders, & Wolf, 1969; Medland & Stachnik, 1972). Following each session, the total occurrence of each target behaviors was counted and divided by divided by the total number of intervals to determine the percent of intervals in which the behavior occurred.

Classwide DBR was also collected to determine if the teacher observed changes in student behavior throughout the course of the study. The teacher was given a DBR form to complete at the end of each observation session (i.e., twice per week) in which she rated the students' on-task and out-of-seat behavior. The same behavioral definitions used during direct observations were used for the teacher DBR. The teacher was asked to place a mark on a scale to indicate the percentage of total time the class displayed each behavior throughout the session. Student behavior was rated on a 0 to 10 scale (0 to

100%) in which 0 (0%) indicated that the behavior *never* occurred while 10 (100%) reflected that the behavior *always* occurred during the observation period.

Lastly, academic productivity was assessed through the use of CBM in written expression immediately following the behavioral observation. Following each session, writing fluency was calculated by counting the total number of words written (TWW) by each student and was used to quantify academic productivity across experimental conditions. To score TWW, each group of letters that had a space before or after, including misspelled and nonsense words, was counted. Additionally, words included in titles and abbreviations (e.g., Dr., TV) were also counted. Symbols and numbers that were not written out (e.g., 3, 10, &, %) were not included in the total. However, dates and currency were counted (e.g., July 4, \$100.00; Hosp et al., 2007). A secondary observer also counted the total number of word written per student to monitor the reliability of the scoring procedures (i.e., interscorer agreement).

Training

One undergraduate and 2 graduate students collected data throughout the course of this study. The author led two 1-hour training sessions to allow data collectors to practice the procedures and to reach a minimum of 80% agreement prior to data collection. For the first training session, each observer viewed an electronic presentation narrated by the author. The presentation provided an overview of the study and description of procedures including direct observation methods, behavior definitions, and administration and scoring criteria of writing CBM. Subsequently, observers used 6 videos to practice collecting partial interval, momentary time sampling, and round-robin observation of students. Five writing probes were also used to practice collecting

procedural integrity and practice scoring total words written for CBM in written expression. Once data collectors had completed the practice videos and scoring, they were asked to complete one 20-minute classwide observation video. Each observer's data were compared to an answer key to measure inter-observer reliability. That is, interobserver agreement was calculated on a point-by-point basis by dividing the total number of agreements by the total number of agreements plus disagreements (i.e., total intervals) and multiplying by 100. The mean inter-observer agreement for training observation sessions was 83%, ranging from 80% to 86%. In addition, each data collector scored two writing probes to assess inter-scorer agreement. This was calculated by dividing the smaller total by the larger total and multiplied by 100. The mean inter-scorer agreement for CBM written expression was 98.5%, ranging from 97.7 to 99%. A second group training session was conducted through teleconference to review procedures before data collection began. All data collectors were blind to the hypotheses of this study

Prior to the first day of data collection, the classroom teacher was given an overview of the study and description of procedures. However, the teacher was blind to the hypotheses of the study. The teacher was also given a DBR form and given brief instructions for completion. For each session, the teacher was asked to complete the preliminary information on the form (i.e., date, time, activity) and rate the occurrence of on-task and out-of-seat behavior demonstrated by the class on a scale of 0 (0%) to 10 (100%) throughout the observation session. The definitions of on-task and out-of-seat behavior were detailed on each DBR form for the teacher to review as needed.

Design

An A-B-A-B reversal design (Baer et al., 1968) was used to determine the efficacy of implementing stability balls to improve on-task and out-of-seat behavior and academic productivity. This research design allows for sequential application, comparison of effectiveness, and intra-subject replication of intervention effects (Barlow & Hersen, 1984). The study included four phases that included A) baseline, B) stability balls, A) baseline, and B) stability ball procedures reinstated. Sessions occurred bi-weekly for a total of eight weeks. During each session, student on-task and out-of-seat behavior was observed and the teacher completed a DBR form. Students completed writing prompts administered in a classwide format. During baseline sessions, the class was conducted as usual while student behavior was observed by data collectors, their behavior rated by the teacher, and their writing productivity was measured while seated on traditional classroom chairs. Initial baseline phase (A) lasted three sessions. After the first baseline condition, classroom chairs were removed and replaced with stability balls (B) for five sessions. Student behavior was observed and rated, and students completed writing prompts. Then stability balls were removed and each student returned to sitting on their typical classroom chair (A) for four sessions. After returning to baseline, stability balls (B) were reintroduced for three sessions until the conclusion of the study. It is important to note that the duration of the return to stability ball phase was shortened due to an alteration in the classroom schedule.

Procedures

Baseline. During baseline, the teacher was instructed to conduct her class as usual. Classroom activities, teacher behavior, and seating were not altered. During a continuous writing lesson, trained observers recorded the occurrence and nonoccurrence

of on-task and out-of-seat behaviors in the classroom twice per week. Individual student data were not collected for these measures. Instead, observers alternated every 10 seconds and reported a total of each behavior by all observed students. The teacher also completed a DBR regarding classwide behavior during observation sessions. She was asked to indicate on a scale of 0 to 10 (i.e., 0 to 100%) the frequency in which the students displayed on-task and out-of-seat behavior throughout the session. Following each behavioral observation and DBR, writing prompts were administered in which students were given a story starter and 1 minute to think about it. Then students were given 3 minutes to write about the story. After writing packets were collected, the administrator counted the total number of words written by each student.

Stability Balls. Aside from the apparatus students sat on at their desks, the same assessment procedures were used during baseline (i.e., classroom chairs) and intervention (i.e., stability balls). While students were seated on stability balls, trained observers recorded occurrences and non-occurrences of on-task and out-of-seat behavior twice per week and the teacher completed a DBR form. After each observation, students were asked to complete a writing probe. Stability balls were then removed and classroom chairs were reinstated. Following return to baseline sessions, stability balls were reintroduced and served as the concluding condition of the study.

Data Analysis. Throughout the study, data were visually analyzed after each session to assess the level and trend of the data to determine phase changes. In addition, visual analysis was used to determine which seating method was most effective at improving student behavior and writing productivity. Results of this study were examined using certain characteristics to determine intervention effectiveness including average of

each phase, change in level of performance from one phase to the next, trend in performance across phases, and percentage of nonoverlapping data (PND; Cooper et al., 2007; Kazdin, 1998, 2001; Kennedy, 2005; Richards, Taylor, Ramasamy, & Richards, 1999). PND is a method used to calculate the number or non-overlap between baseline and intervention phases in order to supplement visual inspection of single subject research designs (Parker & Vannest, 2009; Scruggs, Mastropieri, & Castro, 1987). For on-task behavior, PND was calculated by identifying the highest data point in baseline and determining the total number of data points in intervention conditions that exceeded this point. For out of seat behavior, PND was calculated by identifying the lowest data point in baseline and determining the total number of data points in intervention conditions that were below this point. The number of non-overlapping data points was divided by the total number of data points in the intervention condition and multiplied by 100. PND scores range from 0% to 100% with higher scores indicating a more successful intervention. Scruggs, Mastropieri, Cook, and Escobar (1986) outlined specific criteria for interpreting PND such that a percentage greater than 90% is highly effective, 70% to 90% fairly effective, 50% to 70% questionable effectiveness, and less than 50% reflects unreliable treatment.

Reliability and Integrity. Inter-observer reliability, procedural integrity, and inter-scorer reliability were collected and analyzed on 33% of sessions. During these sessions, a second trained researcher simultaneously observed the classroom to obtain inter-observer reliability. Reliability estimates were calculated using percent agreement for on-task and out-of-seat behavior. Percentage of agreement was calculated on a point-by-point basis in which an agreement was defined as both observers agreeing on the

occurrence or nonoccurrence of both on-task and out-of-seat behavior within the interval. The number of agreements was calculated and divided by the total number of agreements and disagreements and multiplied by 100 to obtain a percentage of agreement across all intervals.

During writing sessions, a second observer completed the writing protocol checklist to evaluate the procedural integrity of the writing probe administration. The total number of steps completed per session was divided by the total number of steps and multiplied by 100 to determine procedural integrity of the administration. In addition, inter-scorer agreement for TWW was also calculated across sessions to monitor the reliability of scoring across raters. Two raters recorded the TWW by each student and total scores were compared. The smaller score divided by the larger score and multiplied by 100 was calculated to determine the percent agreement of TWW reported by the raters.

Social Validity. At the conclusion of the study, the classroom teacher completed the *Intervention Rating Profile* (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985) to assess the social acceptability of the procedures and perceived outcomes of the intervention. The IRP-15 is a 15-item Likert-type scale that assesses the acceptability of an intervention (see Appendix H). Individual item scores range from 1 (*strongly disagree*) to 6 (*strongly agree*) and total instrument scores range from 15 to 90 with higher scores indicating stronger acceptance. The wording on this measure was changed slightly to reflect its use with a classwide intervention. Student feedback regarding the intervention was also obtained at the end of the study using the *Kids Intervention Profile* (KIP; Eckert, Coddington, Hier, Sullivan, & Malandrino, 2014). The KIP is an 8-item

questionnaire that assesses the acceptability of the intervention and perceived impact on student skills (see Appendix I). Items are rated using boxes that gradually increase in size to correspond to their preference ranging from *not at all* to *very, very much*. In other words, consistently small boxes indicate disagreement with the intervention while frequent selection of large boxes indicates stronger acceptance. These boxes were quantified so that individual item scores ranged from 1 being *not at all* (i.e., smallest box) to 5 being *very, very much* (i.e., largest box). The wording on this measure was slightly modified to reflect its use with stability balls as the intervention.

Chapter 3

Results

Direct Observation

Results of classwide direct observation of on-task and out-of-seat behavior are presented in Figure 1. This indicates the percent of 10-second intervals in which the targeted behaviors were observed during baseline and stability ball conditions.

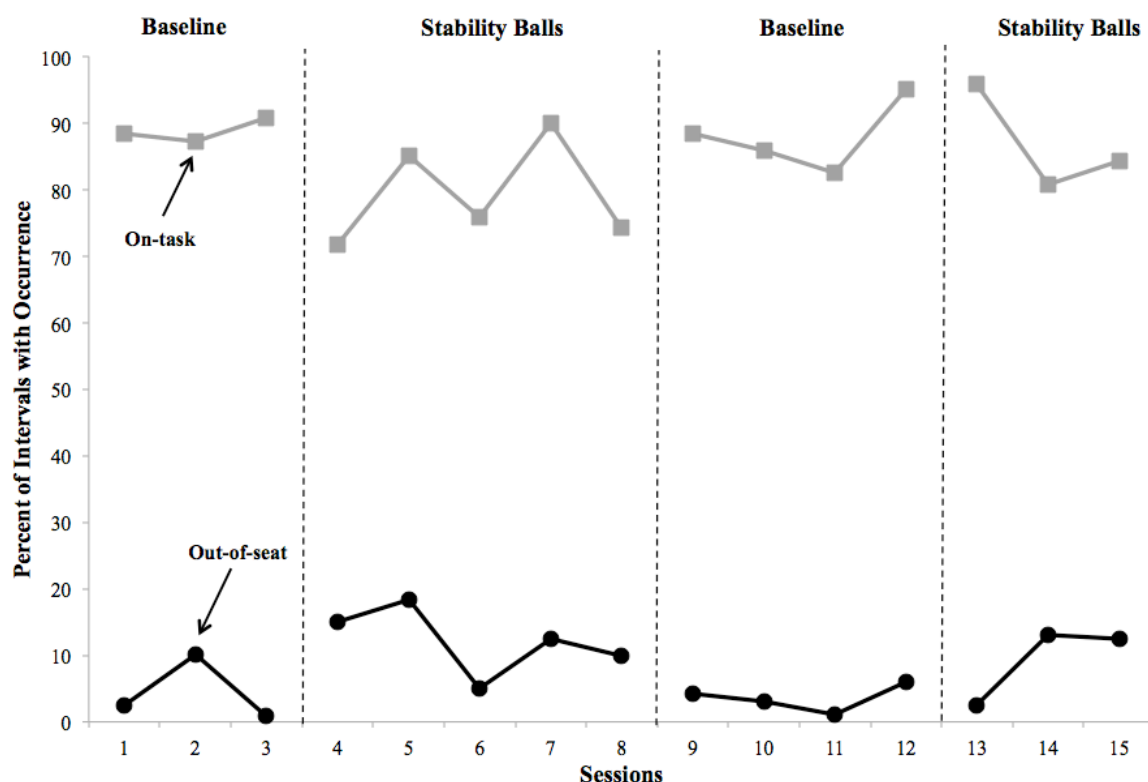


Figure 1. Percentage of intervals in which on-task and out-of-seat behavior were observed classwide during baseline and stability ball conditions.

On-Task Behavior. After implementing stability balls, on-task behavior decreased from a mean of 88.8% of intervals during initial baseline to a mean of 79.4% of intervals during initial intervention phase. During return to baseline, on-task behavior increased to a mean of 87.9% of intervals and return to stability ball phase produced a slight decrease in on-task behavior to a mean of 86.9% of intervals. Baseline phases

produced an overall range of on-task behavior from 82.5% to 95% of intervals ($M=88.3\%$). Stability ball phases produced an overall range of on-task behaviors from 71.7% to 95.8% of intervals ($M=82.3\%$). These results indicate that stability balls demonstrated similar overall on-task behavior in comparison to baseline with a slight reduction.

In addition, on-task behavior was more variable during intervention. That is, on-task behavior ranged from 87.3% to 90.8% of intervals during initial baseline while it ranged from 71.7% to 90% during initial stability ball conditions. During return to baseline, on-task behavior ranged from 82.5% to 95% of intervals though it ranged from 80.8% to 95.8% during the final stability ball phase. For initial baseline and stability ball phases, the percentage of non-overlapping data points was 0% as the desired effect was to increase on-task behavior. During return to baseline and intervention phases, the percentage of non-overlapping data points was 33.3%. Table 1 includes the range and means for each phase and overall phases.

Table 1.
Phase Means, Overall Means, and Overall Range of Observed On-Task Behavior.

	<i>M</i>				<i>Phase M</i>		<i>Overall Range</i>	
	A1	B1	A2	B2	A	B	A	B
On-Task	88.8	79.4	87.9	86.9	88.3	82.3	82.5-95	71.7-95.8

Note. A denotes baseline phases; A1 denotes initial baseline; A2 denotes return to baseline. B denotes stability ball phases; B1 denotes initial stability ball intervention; B2 denotes return to stability ball intervention. These data are presented as percentages of intervals observed.

Out-of-Seat Behavior. Stability balls demonstrated an increase in out-of-seat behavior from a mean of 4.5% of intervals during initial baseline to a mean of 12.2% during intervention. During return to baseline, out-of-seat behavior decreased to a mean of 3.6% of intervals and return to intervention produced an increase to 9.3% of intervals. Baseline phases produced an overall range of targeted behavior from 0.8% to 10% of

intervals. In comparison, intervention phases resulted in out-of-seat behavior ranging from 2.5% to 18.3%. Within each phase, out-of-seat behavior was variable. During initial baseline, out-of-seat behavior ranged from 0.8% to 10.2%.

Out-of-seat behavior during initial intervention conditions ranged from 5% to 18.3% of intervals. Return to baseline demonstrated less behavior than initial baseline, ranging from 1% to 6% of intervals while return to intervention phases ranged from 2.5% to 13%, which is similar to the results of the initial intervention phase. In addition, PND for initial baseline and successive phases were 0%. Table 2 includes the range and means for each phase and overall phases for out-of-seat behavior.

Table 2.

Phase Means, Overall Means, and Overall Range of Observed Off-Task Behavior.

	<i>M</i>				Phase <i>M</i>		Overall Range	
	A1	B1	A2	B2	A	B	A	B
Out-of-Seat	4.5	12.2	3.6	9.3	3.2	11	0.8-10	2.5-18.3

Note. A denotes baseline phases; A1 denotes initial baseline; A2 denotes return to baseline. B denotes stability ball phases; B1 denotes initial stability ball intervention; B2 denotes return to stability ball intervention. These data are presented as percentages of intervals observed.

Direct Behavior Rating

Results of teacher DBR of on-task and out-of-seat behavior are presented in Figure 2. This indicates the percent of each session in which on-task and out-of-seat behavior were rated by the teacher (DBR) during baseline and stability ball conditions.

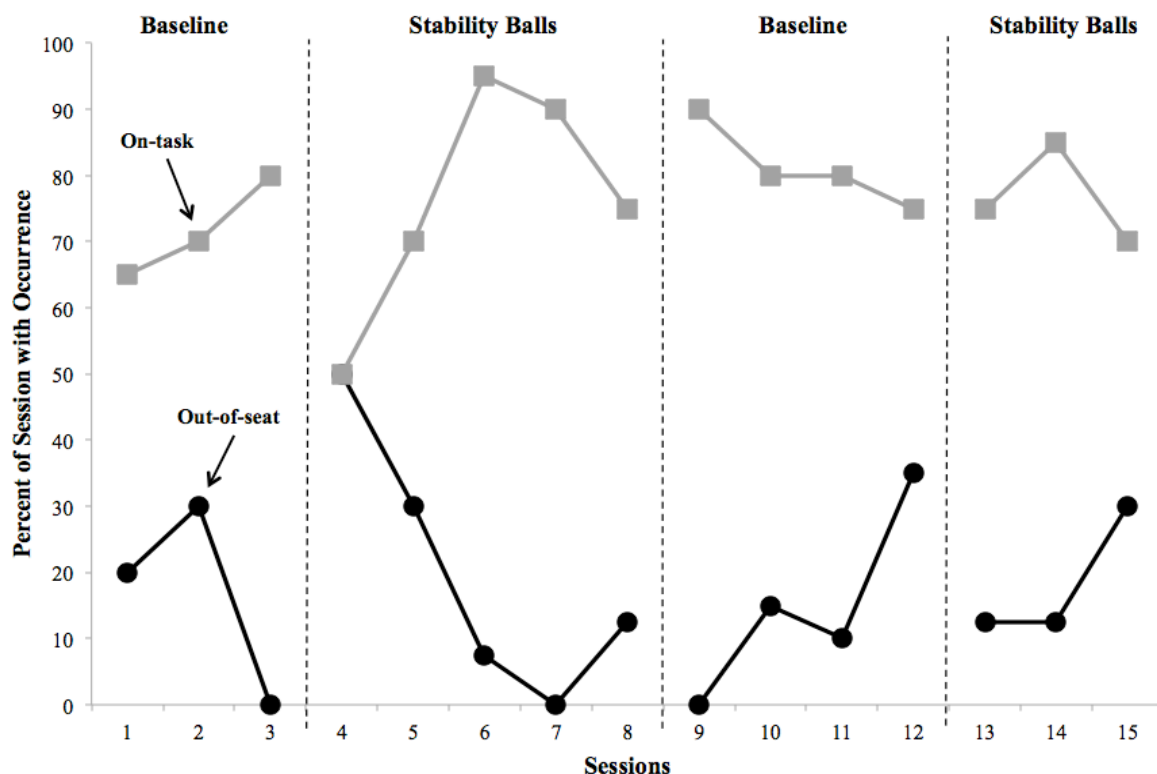


Figure 2. Percentage of each session in which on-task and out-of-seat behavior were rated by the teacher during baseline and stability ball conditions.

On-Task Behavior. Based on teacher DBR of on-task behavior, the stability ball intervention conditions did not indicate improvement in student behavior from baseline over the course of the study. During initial baseline phase, the mean rating of on-task behavior was 71.7%, ranging from 65% to 80%. This level of behavior decreased to 50% at the beginning of the initial intervention phase, but increased to 95% before decreasing to baseline levels again ($M=76\%$). Return to baseline produced an increase in on-task behavior to an average of 81.3%, ranging from 75% to 90%. Teacher ratings decreased during return to intervention with a mean rating of 76.7%, ranging from 70% to 85%. Overall, on-task behavior was similarly rated across conditions with teacher ratings ranging from 65% to 95% during baseline phases and 50% to 95% during intervention conditions. The percentage of non-overlapping data points was 40% for initial baseline

and intervention phases, while 33% of data were non-overlapping during return to baseline and intervention phases. Table 3 includes the range and means for each phase and overall phases.

Table 3.

Phase Means, Overall Means, and Overall Range of Teacher On-Task DBR

	<i>M</i>				<i>Phase M</i>		<i>Overall Range</i>	
	A1	B1	A2	B2	A	B	A	B
On-Task	71.7	76	81.3	76.7	77.2	76.3	65-90	50-95

Note. A denotes baseline phases; A1 denotes initial baseline; A2 denotes return to baseline. B denotes stability ball phases; B1 denotes initial stability ball intervention; B2 denotes return to stability ball intervention.

Out-of-Seat Behavior. Teacher ratings of out-of-seat behavior were similarly variable as on-task behavior and did not indicate clear improvements between baseline and intervention conditions. During initial baseline conditions, the classroom teacher rated out-of-seat behavior to occur 16.7% average, ranging from 0% to 30%. The level of out-of-seat behavior increased during initial intervention conditions to 50% occurrence, however decreased to baseline levels resulting in a slight increase of behavior ($M=20\%$). Return to baseline produced similar behavior ratings of out-of-seat behavior ($M=15\%$) and return to intervention demonstrated an increase ratings ($M=18.3\%$). Overall, out-of-seat behavior ranged from 0% to 35% during baseline and 0% to 50% during stability ball conditions. The percentage of non-overlapping data points during initial baseline and intervention phases for out-of-seat behavior was 20%, while all data were overlapping within return to baseline and return to stability ball phases. Table 4 includes the range and means of out-of-seat behavior for each phase and overall phases.

Table 4.

Phase Means, Overall Means, and Overall Range of Teacher Out-of-Seat DBR

	<i>M</i>				<i>Phase M</i>		<i>Overall Range</i>	
	A1	B1	A2	B2	A	B	A	B
Out-of-Seat	16.7	20	15	18.3	15.7	19.4	0-35	0-50

Note. A denotes baseline phases; A1 denotes initial baseline; A2 denotes return to baseline. B denotes stability ball phases; B1 denotes initial stability ball intervention; B2 denotes return to stability ball intervention.

Academic Productivity

Classwide academic productivity of written expression is presented in Figure 3.

This indicates the total words written on average during baseline and intervention conditions.

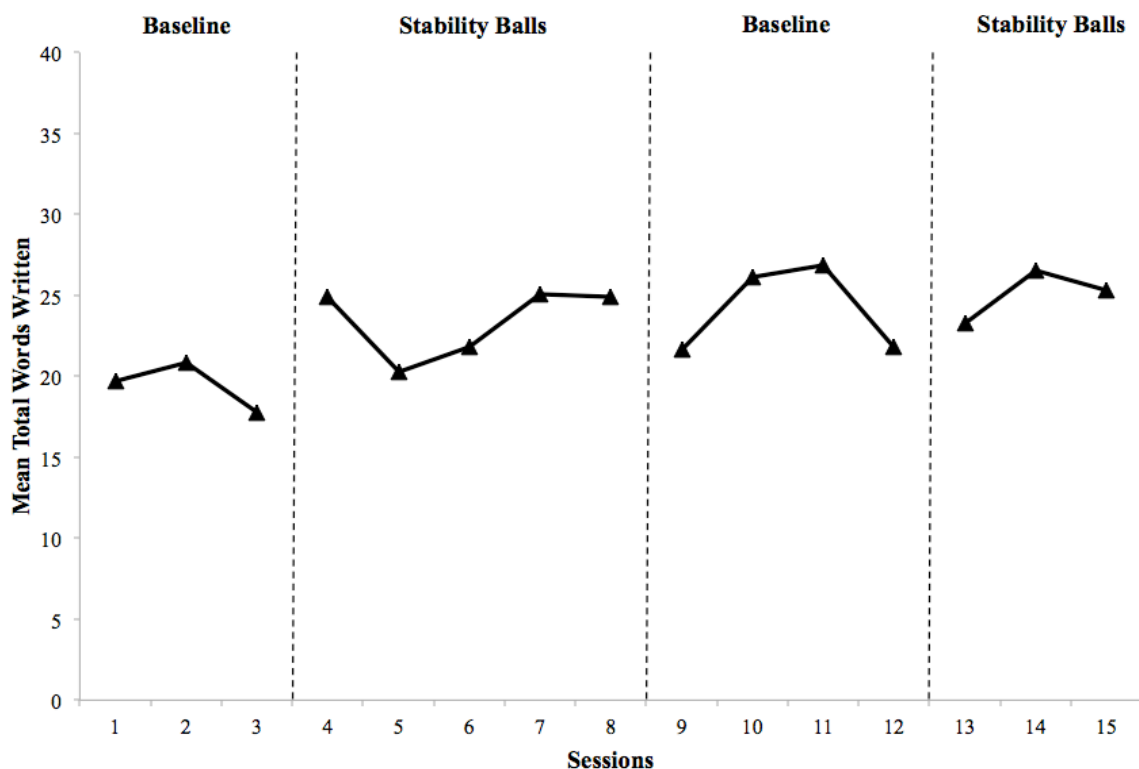


Figure 3. Mean total words written (TWW) classwide during baseline and intervention conditions.

For classwide academic productivity, stability balls produced an increase in writing fluency from a mean ranging from 17.8 to 20.9 total words written during initial baseline to a mean of 20.3 to 25.1 total words written during initial intervention phase. Mean writing fluency remained at similar levels during return to baseline, ranging from an average of 21.7 to 26.8 total words written. Similarly, mean writing fluency during return to intervention ranged from 23.3 to 26.5 total words written. The results

demonstrate that stability balls were as effective as chairs at the classwide level due to the amount of overlapping data points across conditions. That is, the percentage of non-overlapping data points during initial baseline and intervention phases was 80%, although all data were overlapping within return to baseline and return to stability ball phases. However, it is important to note that students wrote a mean of 21.7 words during initial baseline which increased to a mean of 25.3 total words written at the conclusion of the study. In other words, students wrote an average of 3.6 words more after 8 weeks in comparison to baseline.

Reliability and Integrity

Inter-observer agreement, procedural integrity, and inter-scorer agreement were collected for 33% of sessions. The mean total agreement for direct behavioral observations was 89.7%, ranging from 85% to 95%. The mean procedural integrity for writing prompts was 100% across sessions. The mean inter-scorer agreement for TWW was 99.9%, ranging from 99.6% to 100%.

Social Validity

The IRP-15 was administered to the teacher to obtain an estimate of intervention acceptability. A mean item score of 6 out of 6 was obtained, indicating that the classroom teacher reported high acceptability of the intervention. Similarly, the 20 second-grade students were administered the KIP to obtain an estimate of intervention acceptability. Based on the classwide ratings on the KIP, students reported that they enjoyed stability balls ($M=4.4$) and liked sitting on them ($M=4.2$). Students rarely wanted to stop sitting on the stability balls ($M=1.8$) and sometimes wanted to work more while seated on them ($M=3.1$). Overall, students indicated that sitting on the stability ball somewhat helped

them ($M=3.7$), both improving behavior ($M=3.8$) and writing performance ($M=3.6$). A mean item score of 3.8 out of 5 was obtained on the KIP indicating that students reported medium high acceptability of the stability balls in the classroom.

Chapter 4

Discussion

Few studies have investigated stability balls as a classroom intervention. Results of the first studies conducted by Illi (1994) and Witt and Talbot (1998) found that stability balls were not only beneficial for student back-health, but also indicated positive improvement in sustaining attention, in-seat behaviors, and academic performance. However, these outcomes were not measured directly and only documented anecdotally.

Schilling and colleagues (2003) were the first to systematically examine the effectiveness of stability balls using 10-second momentary time sampling of student in-seat behavior and legible words written. Additionally, Schilling and Schwartz (2004) measured student engagement and in-seat behavior using 10-second momentary time sampling. Conversely, Bagatell and colleagues (2010) investigated the use of stability balls using video recordings to document the duration of student engagement and out-of-seat behavior, while Fedewa and Erwin (2011) used 30-second momentary time sampling of in-seat and on-task behavior. Each of these studies used informal social validity questionnaires to document treatment acceptability from educators and students.

The existing literature has primarily investigated the effects of stability balls with students with disabilities. These studies have been conducted within various settings (e.g., preschool, elementary, college) and utilized various research designs and outcome measures to document effectiveness. In addition, previous research has been implemented with individual students, some of which have been seated on stability balls only during the duration of the observation period (e.g., Schilling & Schwartz, 2004), or classwide without documenting classwide outcomes (e.g., Fedewa & Erwin, 2011). Despite their

increasing popularity as a classwide intervention, there are currently no published studies reporting the effectiveness of stability balls at this level.

While the current study extends previous research of stability balls, it also represents the first study investigating the intervention at the classwide level. Additionally, this was the first study to utilize various methods with multiple dependent measures to investigate their effects. That is, this study examined the effects of stability balls in comparison to classroom chairs using direct observation of student on-task and out-of-seat behavior, teacher DBR, and academic productivity in a second grade classroom. Using an A-B-A-B reversal design, this study sought to investigate if stability balls improved classwide student behavior in comparison to classroom chairs, if teacher DBR demonstrated similar improvements, and whether or not stability balls showed an increase in student writing fluency. In addition, the study examined teacher and student acceptability of stability balls at a classwide level using standardized assessment methods.

Primary Findings

It was hypothesized that students would be on-task more and out-of-seat less while seated on stability balls in comparison to classroom chairs. Based on the results of this study, these hypotheses were not supported. Stability balls did not show marked improvement over baseline for on-task behavior. Additionally, these data overlapped considerably with a PND of 0%. These results may have been impacted by a ceiling effect for on-task behavior that limited a clear distinction between chairs and stability balls. In other words, classwide on-task behavior was an average of 88.8% of intervals during initial baseline which limited the opportunity for improvement in overall on-task

behavior. Moreover, out-of-seat behavior did not improve while students were seated on stability balls in comparison to classroom chairs. Although results demonstrated a slight increase in out-of-seat behavior during stability ball conditions, these data overlapped during initial and subsequent conditions with PND totaling 0%. Similarly to on-task behavior, classwide out-of-seat behavior may have been impacted by a floor effect that limited the opportunity for improvement in overall behavior. That is, classwide behavior of out-of-seat behavior was an average of 4.5% of intervals during initial baseline and did not exceed 18.3% of intervals over the course of the study.

It was hypothesized that teacher DBR would demonstrate similar improvements in student behavior. Teacher DBR data did not demonstrate improvement in overall on-task behavior when comparing classroom chairs to stability balls. There was greater variability during initial conditions, but these effects were not replicated during return to stability balls. In addition, teacher DBR of out-of-seat behavior was similarly variable. Overall, teacher DBR ratings did not coincide with direct observation as documented in previous research (e.g., Riley-Tillman et al., 2009). For this study, observation of individual student behavior was aggregated to represent classwide behavior. However, teacher ratings represent an accumulation of student behavior overall. Thus, there is a possibility that percent occurrence of direct observation underestimated the behaviors observed by the teacher classwide. Alternatively, teacher DBR data may have been skewed by the behavior of some students that engaged in the target behaviors more or less frequently but did not represent classwide behavior (i.e., outliers). It is also likely that these data were affected by the teacher's preference for stability balls prior to

participation in this study. Formal training prior to competing DBR forms may have accounted for teacher bias and limited impact of outliers on classwide behavior ratings.

For academic productivity, it was hypothesized that students would increase their writing fluency while seated on stability balls in comparison to classroom chairs. Results did not show great improvement in writing fluency at the classwide level, yet writing fluency while seated on stability balls was similar to classroom chairs. After initial baseline, TWW increased while students were seated on stability balls. However, these results were not replicated across return to baseline and stability balls conditions. Practice effects may have impacted writing performance, as the class had not completed CBM writing probes prior to their participation in this study. Despite limited gains observed through visual analysis, there were gains in the average total words written classwide from initial baseline (TWW=21.7) to stability balls (TWW=25.3). This indicates that students wrote 3.6 more words on average over the course of the study (i.e., 8 weeks). Although stability balls did not demonstrate marked improvement, writing fluency increased overall indicating that stability balls are similarly effective in comparison to classroom chairs.

Strengths of this study were strong reliability of direct observation and procedural integrity of writing sessions. These reliability estimates reflect the constancy of the observation method such that changes in these data can be attributed to changes in targeted behavior as opposed to the method itself (Hartmann, 1977). Although there is not an established standard for interobserver agreement, 80% or higher is preferred (Barlow et al., 2009). Results demonstrated an average interobserver agreement of 89.7%, which exceeds the preferred criterion. Additionally, interscorer agreement was an

average of 99.9% and procedural integrity of writing prompt administration was 100% across sessions. These results indicate that direct observation, scoring of TWW, and administration of writing prompts were consistent throughout the course of the study. Thus, results of this study were documented as intended.

The teacher reported very high acceptability of stability balls in the classroom. An average score of 6 out of 6 was reported, with a total score of 90. This is the highest score possible on the measure indicating strong acceptance of stability balls. Although this is not surprising considering she had voluntarily implemented stability balls previously, these are favorable results in regards to the acceptability of stability balls as a classroom intervention. As stated previously, it is likely that the teacher's preference for the alternative seating may have impacted the DBR results and the high acceptability of stability balls supports these conclusions. It is important to note that although the teacher reported strong acceptability of stability balls, DBR ratings did not demonstrate a strong distinction between classroom chairs and stability balls for improving classwide behavior.

Additionally, students' ratings on the KIP indicated high acceptability. Overall, students enjoyed sitting on stability balls and wished they had more opportunities to sit on them at times. Most students reported improvements in their behavior while seated on the stability balls with 70% indicating they helped a lot to very much, 10% of students reported some improvement, and 20% indicated that stability balls improved their behavior a little bit to not at all. These findings indicate that most students attribute stability balls as an impactful intervention for improving their behavior. Although students were not specifically asked to compare their performance while seated on

stability balls to classroom chairs, it is noteworthy that student report does not coincide with direct observation of behavior. In other words, student behavior did not substantially improve while seated on stability balls despite student perception of doing so. Student behavior was only observed during a 20-minute session twice per week. Thus, student perception of improvements in overall behavior may have occurred beyond the observation period as reported on the KIP. Also, behavior definitions used for observation were not defined for the students. Therefore, students may have reported improvements in overall behavior as opposed to the specific behaviors that were assessed during the study. In addition, most students (65%) indicated that sitting on stability balls improved their writing with 15% reporting some improvements, and 20% indicated a little bit to not at all. Student writing was only measured using a 3-minute writing probe as opposed to academic outcomes in other areas. This may account for the discrepancy between student ratings and writing performance. Again, these findings indicate that most students consider stability balls as an effective modality for improving their writing performance and the observed performance supports these claims overall. These results also suggest that student interpretation of the effects of stability balls may be related to individual performance as opposed to classwide outcomes.

Limitations, Future Research, and Implications

Only one classroom with 20 students participated in this study and was selected based on convenience. In comparison to typical classrooms, this class size is rather small. Granted this classroom had a greater number of students in comparison to those targeted in previous studies, the addition of 5 or more students in the classroom may have demonstrated substantial differences in outcomes. The classroom teacher also

implemented stability balls at the beginning of the school year before discontinuing their use 2 weeks prior to baseline. This may have affected teacher ratings of student behavior as well as responses on the social validity measures. Additionally, student behavior and academic productivity were only assessed during a writing lesson for each session.

Therefore, future researchers should evaluate the effects of stability balls with classrooms that have yet to implement stability balls in comparison to those that have used them previously. Additional classrooms should also be evaluated simultaneously including a control classroom to document effectiveness. A comparison of classrooms that have no experience implementing stability balls may demonstrate dissimilar outcomes.

Documenting these effects across multiple instructional periods and activities may also prove beneficial and allow for investigation of generalization across settings.

Additionally, this classroom was well behaved which limited the opportunity for improvements in behavior. That is, student on-task behavior occurred an average of 85% of intervals and out-of-seat occurred an average of 7.8% of intervals over the course of the study. Selection of classrooms that have lower rates of on-task and higher rates of out-of-seat behavior may allow for greater distinction between chairs and stability balls, thus lessening the impact of ceiling and floor effects on student behavior.

Although the purpose of the study was to examine the classwide effects of stability balls, another limitation is that individual data were not collected. Results demonstrate that stability balls did not improve classwide on-task and out-of-seat behavior. However, results were comparable to classroom chairs only with greater variability in behavior. Due to the classwide behavioral observations, it is impossible to differentiate students who responded to the classwide use of stability balls in comparison

to others. Future research should consider implementing stability balls classwide with target students and including a control classroom to compare effects. Furthermore, writing fluency was also examined at the classwide level by reporting a mean of total words written across students. Subsequent research is needed to examine both classwide and individual student writing fluency and other academic areas to determine the appropriateness of stability balls as a support to academic performance.

Lastly, educators should consider the cost-benefit of stability balls as a classroom intervention in comparison to classroom chairs prior to implementation. Olson and colleagues (2014) found that lack of resources was the greatest barrier to implementation for those interested in using stability balls in their classroom (67%), followed by concern for misuse by students (24%), concern for personal distraction (5.6%), and lack of support from administration (3.7%). In order to justify allocating limited resources to this alternative to classroom seating, documentation of clear benefits is still needed prior to implementation. The results of the current study indicate that stability balls produce similar results in terms of classwide behavior in comparison to classroom chairs. Some improvements were shown for writing fluency over the course of the study, however it is necessary to consider the feasibility of the implementation of stability balls in order to demonstrate slight gains in overall performance. Overall, stability balls did not demonstrate detrimental effects while they did not demonstrate substantial improvement. Therefore, continued research investigating stability balls at the classwide level is needed to determine whether or not the effects of stability balls on student performance outweigh traditional seating.

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Appendix A

Teacher Consent Form

Dear Teacher,

My name is Natasha Olson and I am a doctoral candidate in the School Psychology Doctoral program at Minnesota State University, Mankato. I would like to conduct research in your school under the supervision of my advisor from the Department of Psychology, Dr. Carlos Panahon. The purpose of this study is to examine the effects of stability balls on student behavior and academic performance in the area of writing.

If you agree to participate, you will be asked to implement stability balls in your classroom. Students will sit on stability balls, daily, in order to evaluate the effects on on-task and out-of-seat behavior and writing fluency in comparison to classroom chairs. Stability balls have been suggested to increase levels of focus and attention while improving academic achievement. It is theorized that a student can maintain concentration while seated on the stability ball because the unstable surface requires continuous, yet minor bodily movement. In a sense, the stability ball allows the student to “fidget” or move their body inconspicuously, which then helps the student to stay focused while seated.

I would like to work with you and the participating students in your class for about 8 weeks. During some weeks you will be asked to implement stability balls and other weeks will require classroom chairs. This will allow us to determine with certainty whether stability balls improve student behavior and academic productivity. Before procedures begin, you will be asked to provide information about your classroom including the total number of students in your class, number of males and females, age range, and number of students with and without disabilities. During the eight-week period of the study, trained researchers will observe your classroom bi-weekly for about 20 minutes in order to measure student behavior. After the observation, students will be asked to complete a writing packet in which students are given a story starter and 1 minute to think about it. Then students are given 3 minutes to write a story. During writing sessions, you will be asked to complete a short, classwide behavior rating form in which you will indicate the percentage of total time the class exhibited each target behavior. In total, observation and writing sessions will last approximately 30 minutes and will take place about 2 times per week. At the conclusion of the study, you will be asked to complete the *Intervention Rating Profile-15* which is a 15-item questionnaire requesting feedback about the intervention.

The potential risks of participating in this project are minimal and may involve a short disruption in your daily schedule. In order to reduce the risk of disrupting your classroom, all procedures will require no more than 30 minutes each day and sessions will be scheduled on a consistent basis.

Initial: _____

Your participation in this study is voluntary and whether or not you choose to participate will not affect your relationship with Minnesota State University, Mankato. If you choose to participate, your involvement will not be revealed to anyone other than your referring principal. Your name will not be used on any reports and any identifying information will be kept confidential. You are free to stop participating in this study at any time. If you would like to discontinue participation, please contact me or Dr. Panahon by telephone, email, or in writing.

A possible benefit of this research is the reduction of problem behaviors and increased academic performance. Students participating in this study may benefit from decreased problem behaviors allowing for limited disruptions in the classroom thus increasing academic engaged time. Providing students with the opportunity to practice writing on a weekly basis may increase writing skills that will hopefully produce academic gains in this skill set. Weekly writing practice may increase self-esteem based on additional exposure to various writing activities and increased productivity. We will also provide you with all the information you will need to continue the intervention should you choose to.

This study may also benefit society by demonstrating the effectiveness of such classroom interventions for use with other children. Evaluating the effects of stability balls on student performance can inform potential ways to improve classroom behavior and academic skills. The results of this study could be advantageous for educators and practitioners such that the use of stability balls could be implemented to help additional students succeed in the classroom. The results of this study will add further information to the literature in an effort to evaluate interventions as evidence-based practice.

If you have any questions please feel free to contact me at natasha.olson@mnsu.edu or (651) 283-5972. You may also contact my advisor, Dr. Panahon, at carlos.panahon@mnsu.edu or (507) 389-2815. If you have any questions about the rights of research participants please contact Dr. Barry Ries, Administrator of the Institutional Review Board, at (507) 389-2321 or barry.ries@mnsu.edu.

Enclosed is a copy of this letter for you to keep. If you are willing to participate in our study please initial the first page and sign this page of this letter and return it to me. Your signature indicates that you have read and understand the information above and willingly agree to participate. Thank you for your consideration.

I have read the above information and understand that my participation is voluntary and I may stop at any time. I consent to participate in the study.

Your Name (printed) _____

Your Signature _____ Date _____

MSU IRBnet ID#: 658071

Date of MSU IRB approval: 10/06/2014

Appendix B

Parent Consent Form

Dear Parent or Caregiver,

My name is Natasha Olson and I am a doctoral candidate in the School Psychology program at Minnesota State University, Mankato. I would like to conduct research in your school under the supervision of my advisor from the Department of Psychology, Dr. Carlos J. Panahon. The purpose of this study is to examine the effects of stability balls, sometimes referred to as yoga or exercise balls, on student behavior and academic performance in the area of writing.

If you agree to participate, your child will be given a stability ball for classroom use. Students will sit on stability balls, daily, in order to evaluate the effects on on-task and out-of-seat behavior and writing fluency in comparison to classroom chairs. Stability balls have been suggested to increase levels of focus and attention while improving academic achievement. It is theorized that a student can maintain concentration while seated on the stability ball because the unstable surface requires continuous, yet minor bodily movement. In a sense, the stability ball allows the student to “fidget” or move their body inconspicuously, which then helps the student to stay focused while seated.

I would like to work with your child’s classroom for about 8 weeks. During some weeks, your child will be asked to sit on the stability ball while other weeks he or she will sit on a regular classroom chair. During the eight-week period, your child’s class will be observed by trained researchers in order to measure student behavior. On-task, out-of-seat, and foot placement while seated on stability balls and classroom chairs will be recorded. Observations will occur on a bi-weekly basis for about 20 minutes and no names will be recorded during behavior observations.

Your child will also be asked to complete a writing packet in which he or she is given a story starter, or topic, and 1 minute to think about it. An example of a story starter is “It was a hot, dry day and I had been walking for hours without food or water when...” After the minute has expired, your child will have 3 minutes to write as many words as possible. After writing the story, the total number of words your child wrote during the 3-minute period will be recorded. In total, observation and writing sessions will last approximately 30 minutes and will take place 2 times per week. At the conclusion of the study, your child will be asked to complete the Kids Intervention Profile (KIP). The KIP is an 8-item questionnaire that asks your child about his or her perception and preference for the intervention. One question, for example, asks students to rate how much they liked the intervention from *not at all* to *very, very much*.

The potential risks of participating in this project are minimal and may involve a short disruption in your child’s daily schedule. In order to reduce the risk of disrupting your classroom, all procedures will require no more than 30 minutes each day and sessions will be scheduled on a consistent basis. All information obtained in this project will be kept

Initial: _____

confidential by the staff of this research project. All information will be stored in a locked file cabinet at Minnesota State University, Mankato and this information can only be viewed by myself and Dr. Panahon. No information about your child will be released to the public. You may request a copy of the study's results (but not your child's results), which would be mailed to you after the end of the study.

A possible benefit of this research is the reduction of problem behaviors and increased academic performance. Students participating in this study may benefit from decreased problem behaviors allowing for limited disruptions in the classroom thus increasing academic engaged time. Providing students with the opportunity to practice writing on a weekly basis may increase writing skills that will hopefully produce academic gains in this skill set. Weekly writing practice may increase self-esteem based on additional exposure to various writing activities.

This study may also benefit society by demonstrating the effectiveness of such classroom interventions for use with other children. Evaluating the effects of stability balls on student performance can inform potential ways to improve classroom behavior and academic skills. The results of this study could be advantageous for educators and practitioners such that the use of stability balls could be implemented to help additional students succeed in the classroom. The results of this study will add further information to the literature in an effort to evaluate interventions as evidence-based practice.

Your participation in this project is voluntary and whether or not your child participates in this study will not affect your relationship Minnesota State University, Mankato. If your child participates in this study, you and your child have the right to stop at any time. If you would like to discontinue participation during the study, please contact me or Dr. Panahon by telephone, email, or in writing.

If you have any questions please feel free to contact me at natasha.olson@mnsu.edu or (651) 283-5972. You may also contact my advisor, Dr. Panahon, at carlos.panahon@mnsu.edu or (507) 389-2815. If you have any questions about the rights of research participants please contact Dr. Barry Ries, Administrator of the Institutional Review Board, at (507) 389-2321 or barry.ries@mnsu.edu.

If you are willing to participate in our study please initial the first page and sign this page of this letter and return it to your child's teacher. Your signature indicates that you have read and understand the information above and willingly agree to participate. Thank you for your consideration. A copy of this letter will be emailed to you by Mrs. Townsend for your files.

Please print clearly.

I am the legal guardian of (your child's name): _____

Name of parent or guardian: _____

Signed: _____ Date: _____

MSU IRBnet ID#: 658071

Date of MSU IRB approval: 10/06/2014

Appendix C

Student Assent Form

In order for students to participate in this project, each student must provide oral assent to participate prior to the start of the first session. Therefore, each student must orally indicate that he/she is willing to participate in the project before you can begin working with the student. Please read the following script to the child and document whether the student assent has been obtained.

Directions:

1. Say the following to the student,

"I am interested in learning more about student behavior and writing and would like you to help me. Your parent(s) have said that it is okay that I work with you. I want to make sure that it is okay with you. It is totally up to you if you want to do this. Even if you want to do this, you could tell me to stop whenever you would like if you get upset.

Some school days you and the rest of your class will be asked to sit on a stability ball in your classroom and other days you will sit on a regular classroom chair. You will also be asked to write a story a couple times a week for the next couple months. You will spend 5-10 minutes writing a different story each time we work together. The decision you make will not affect your grades in any of your classes.

If you want to rest, or stop completely, you could just tell me or your teacher, you will not get into any trouble. In fact, if you don't want to work with me at all, you don't have to. Also, if you have any questions about what you'll be doing, or if you can't decide whether to do it or not, just ask me, your teacher, or your parents and we'll try to answer them.

If you would like to help me, please say yes. Your parents have already told me that it is ok with them if you would like to do this. Do you have any questions for me your teacher, or parents? You may ask at any time.

Would it be okay if we worked together?"

2. Please circle the child's response to the question:

Yes

No

I don't know

No response

3. Please provide the following information:

Child's Name: _____ **Date:** _____

Appendix D

Direct Observation Form

Date: _____ Time: _____ Condition: _____ Session # _____

Observer: _____ Reliability: Y N Observer 2: _____

Minute		:00 - :10	:11 - :20	:21 - :30	:31 - :40	:41 - :50	:51 - :60
0	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
1	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
2	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
3	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
4	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
5	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
6	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2

Minute		:00 - :10	:11 - :20	:21 - :30	:31 - :40	:41 - :50	:51 - :60
7	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
8	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
9	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
10	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
11	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
12	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
13	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2

Minute		:00 - :10	:11 - :20	:21 - :30	:31 - :40	:41 - :50	:51 - :60
14	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
15	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
16	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
17	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
18	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2
19	Out-of-Seat						
	On-task						
	Foot Placement	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2	0 1 2

Total Out-of-Seat Occurrences = _____ Total Out-of-Seat Nonoccurrences = _____

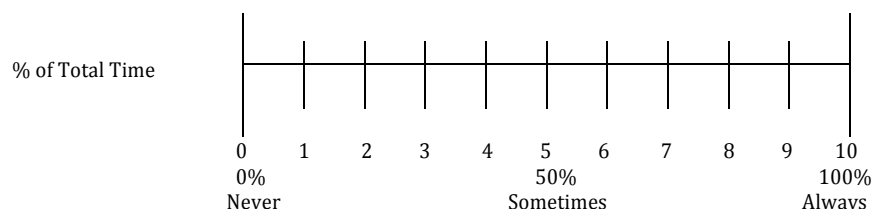
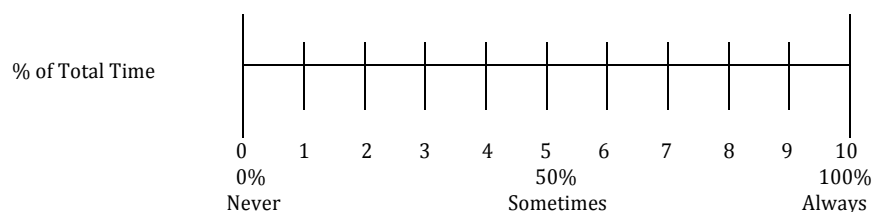
Total On-task Occurrences = _____ Total On-task Nonoccurrences = _____

Appendix E

Direct Behavior Rating Form

Date:	Classroom:	Activity Description:
M T W Th F	Rater:	
Observation Time Start: End:	Behavior Descriptions: On-task is defined as students who are in the designated area of the room, oriented toward the teacher or task, following instructions, participating as instructed, engaged with appropriate materials, and seeking help in an appropriate manner (e.g., raising hand). Out-of-Seat behavior is defined as the student leaving the seated position during instruction and walking within the classroom (i.e., wandering) or out of the classroom without permission. Exceptions included occasions in which a student leaves his or her seat with permission from the teacher. Permission from the teacher is defined as raising one's hand or approaching the teacher and receiving consent to engage in the behavior	

Directions: Place a mark along the line that best reflects the percentage of total time the class exhibited each target behavior. Note that the percentages do not need to total 100% across behaviors because some behaviors may co-vary.

On-Task**Out-of-Seat**

Comments (optional):

Appendix F

Protocol for Writing Prompts

Class: _____ Date: _____ Session #: _____

Experimenter 1: _____ Experimenter 2: _____

Integrity: Y N

Reliability: Y N

Protocol for **Writing Prompts**

- ☐ Researcher distributes copies of writing probes face down to all the students in the class.
- ☐ Say *“Please place your name on the sheet of paper in front of you (the unlined side).”*
- ☐ *“I want you to write a story. I am going to read a sentence to you first, and then I want you to write a short story about what happens. You will have 1 minute to think about your story and then 3 minutes to write it. Do your best work. If you don’t know how to spell a word, you should guess. Are there any questions?”*
- ☐ *“For the next minute think about ... [I stepped into the time machine and...]*
- ☐ Start the stopwatch
- ☐ At the end of 1 minute, say *“Turn the page and start writing.”*
- ☐ While the students are writing, teachers circulate around the room. If students stop writing before the 3-minute timing period has ended, teachers encourage them to continue writing.
- ☐ After 3 additional minutes have expired, say *“Stop writing, please put your pencils down.”* Do not provide any reinforcement or additional prompting.
- ☐ Collect writing probes from all of the students.

Completed ____ out of 9 steps

Appendix G
Writing Packet

Name:

I stepped into the time machine and...



I stepped into the time machine and...

[illegible]

Appendix H

Intervention Rating Profile-15

The purpose of this questionnaire is to obtain information that will aid in the selection of classroom interventions. These interventions will be used by teachers of children with behavior problems. Please circle the number that best describes your agreement or disagreement with each statement using the scale below.

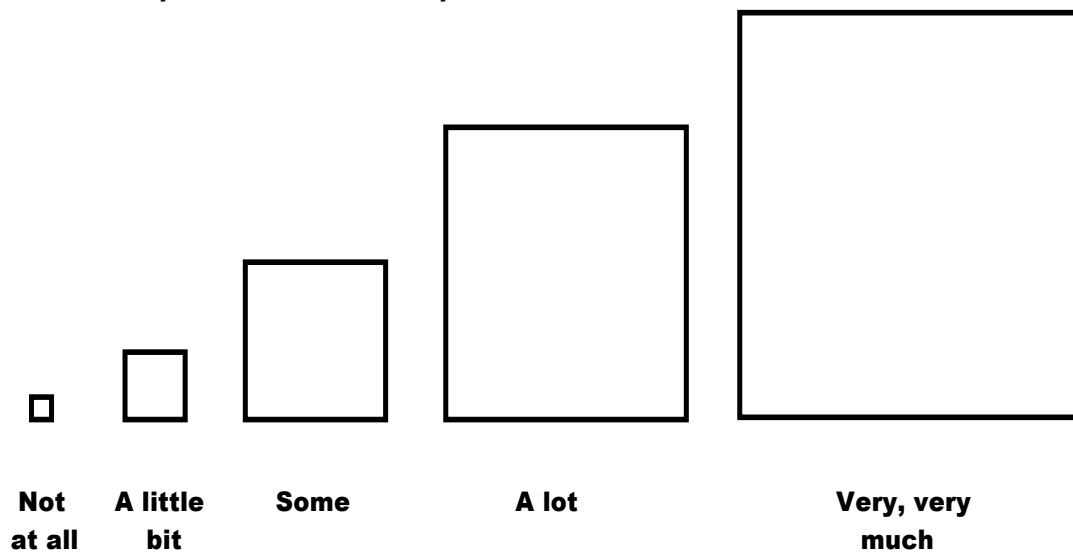
	1=strongly disagree	2=disagree	3=slightly disagree	4=slightly agree	5=agree	6=strongly agree
1. This would be an acceptable intervention for the class's problem behavior.	1	2	3	4	5	6
2. Most teachers would find this intervention appropriate for behavior problems in addition to the one described.	1	2	3	4	5	6
3. This intervention should prove effective in changing the class's problem behavior.	1	2	3	4	5	6
4. I would suggest the use of this intervention to other teachers.	1	2	3	4	5	6
5. The class's problem behavior is severe enough to warrant use of this intervention.	1	2	3	4	5	6
6. Most teachers would find this intervention suitable for the behavior problem(s) described.	1	2	3	4	5	6
7. I would be willing to use this intervention in the classroom setting.	1	2	3	4	5	6
8. This intervention would not result in negative side effects for the class.	1	2	3	4	5	6
9. This intervention would be appropriate for a variety of children.	1	2	3	4	5	6
10. This intervention is consistent with those I have used in classroom settings.	1	2	3	4	5	6
11. The intervention was a fair way to handle the class's problem behavior.	1	2	3	4	5	6
12. This intervention is reasonable for the behavior problem(s) described.	1	2	3	4	5	6
13. I liked the procedures used in this intervention.	1	2	3	4	5	6
14. This intervention was a good way to handle this class's behavior problem.	1	2	3	4	5	6
15. Overall, this intervention would be beneficial for the class.	1	2	3	4	5	6

Appendix I

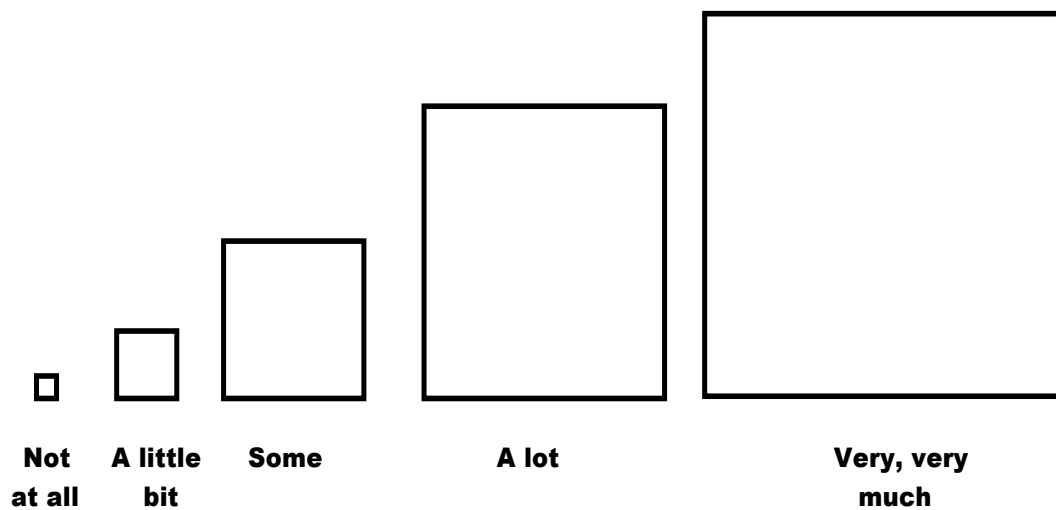
Kids Intervention Profile

Question #1

How much do you like the stability balls?

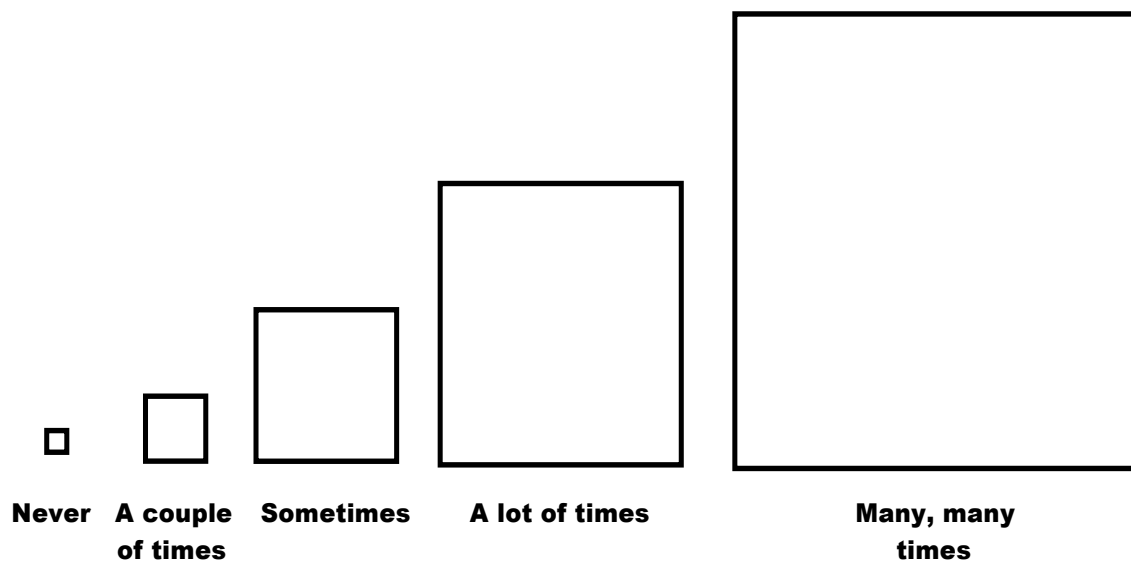
Question #2

How much do you like sitting on stability balls?

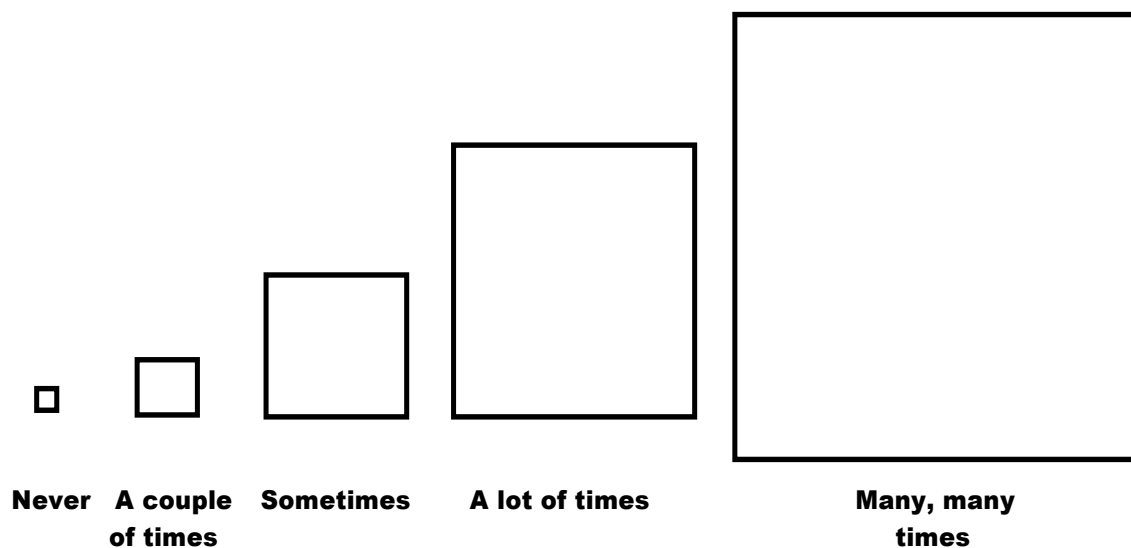


Question #3

Were there times when you didn't want to sit on the stability ball?

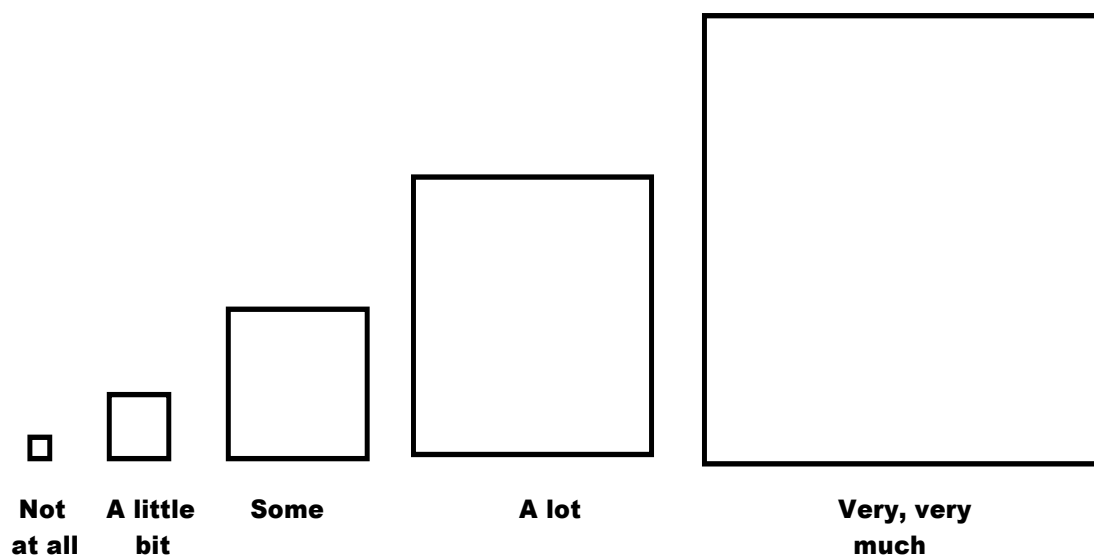
**Question #4**

Were there any times when you wished you could work more while sitting on the stability ball?



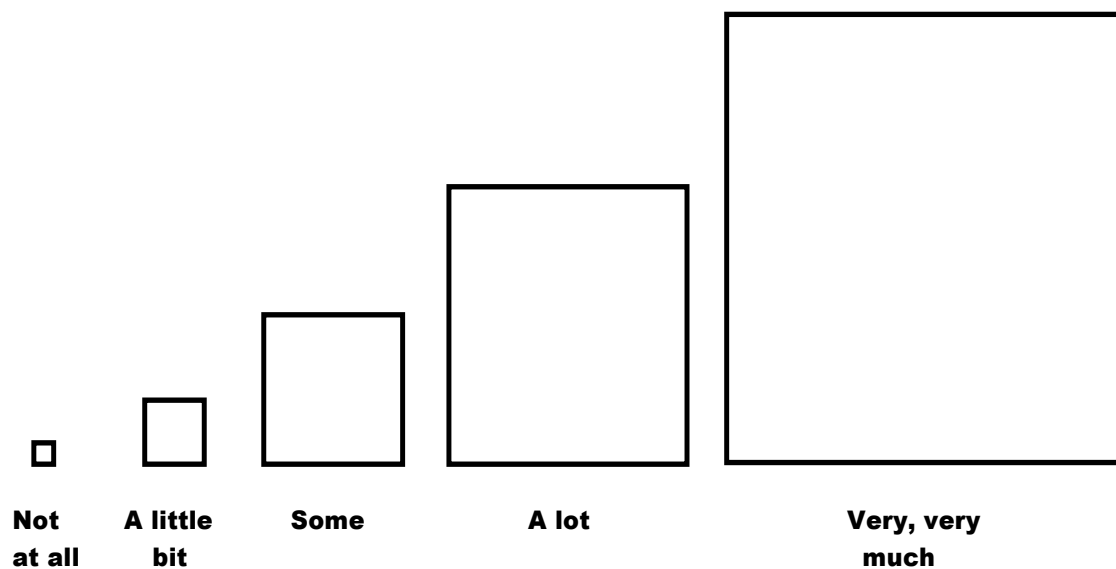
Question #5

How much do you like being seated on the stability ball during class?



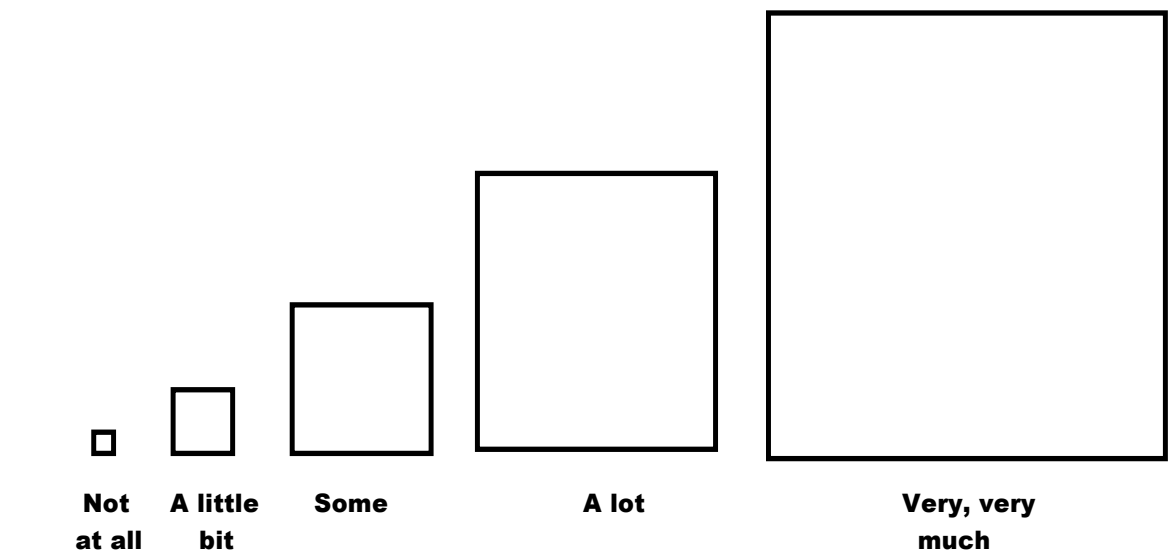
Question #6

How much do you think it helps you when you were seated on the stability ball?



Question #7

Do you think your behavior improved while you were seated on a stability ball?

**Question #8**

Do you think your writing improved while you were seated on a stability ball?

